AMENDMENTS TO THE CLAIMS:

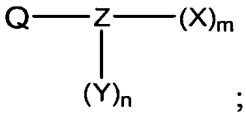
Please amend claims 1, 2, 10, 158, 163, 164, add claim 174 and cancel claims 81,118, 120, 150, 157 and 173 without prejudice or disclaimer as follows. This listing of claims replaces all prior versions and listings of claims in the application.

LISTING OF CLAIMS:

1. (Currently Amended) A method for identifying targets and non-targets of a drug, comprising:

(a) contacting a capture compound with a sample comprising biomolecules to effect capture of biomolecules in the sample, wherein:

the capture compound has the formula:



;

X is selected to covalently bind to biomolecules and requires activation following contacting with the biomolecules to effect covalent binding of the capture compound to a biomolecule ~~selected to covalently bind to biomolecules or to bind with sufficiently high affinity so that the resulting complexes of biomolecule/capture compounds are stable under conditions of mass spectrometric analysis~~;

Y is a pharmaceutical drug, drug fragment, drug intermediate, drug metabolite or prodrug;

Q is a sorting function;

Z is a moiety for presenting X, Y and Q;

m is an integer that is 1 to 100;

n is an integer from 1 to 100; and

contacting is effected for a sufficient time for ~~the~~ interaction between the capture compounds and the biomolecules to reach equilibrium, wherein the interaction with Y and a biomolecule reaches equilibrium;

(b) activating X to form~~forming~~ a covalent linkage or high affinity bond between X and ~~the biomolecule~~ biomolecule(s) in the sample that interact with Y to effect capture thereof; and

(c) isolating and identifying the captured biomolecules, ~~to thereby identify biomolecules that interact with moiety Y~~ wherein the captured biomolecules comprise drug targets and non-targets.

2. (Currently Amended) The method of claim 1, wherein ~~the captured biomolecules comprise drug targets and non-targets, whereby~~ drug non-targets are identified.

Claims 3-4 (Cancelled).

5. (Withdrawn) The method of claim 1 wherein, the moiety Y is linked to the moiety Z in different orientations via different points of attachments on the Y moiety.

6. (Original) The method of claim 1, wherein the biomolecules are proteins.

Claims 7-9 (Cancelled).

10. (Currently Amended) The method of claim 1, wherein Q permits separation of capture compounds by arraying of the capture compounds on a solid support by binding to the surface of the support or a molecule thereon.

Claims 11-14 (Cancelled).

15. (Previously Presented) The method of claim 1, wherein

Z is a moiety that is cleavable prior to or during mass spectrometric analysis of biomolecules bound to the capture compound.

Claim 16 (Cancelled).

17. (Withdrawn) The method of claim 1, wherein

Z is a moiety that is not cleavable prior to or during mass spectrometric analysis of biomolecules bound to the capture compound.

18. (Withdrawn) The method of claim 1, wherein:

Q is a oligonucleotide or oligonucleotide analog that includes a single-stranded portion of sufficient length "j" to form a stable hybrid with a base-complementary single stranded nucleic acid molecule or analog.

Claims 19-21 (Cancelled).

22. (Withdrawn) The method of claim 1, wherein Q has the formula $N^1{}_sB_iN^2{}_u$, wherein:

N^1, B and N^2 are oligonucleotides or oligonucleotide analogs comprising s, t and u members, respectively;

B is a region of sequence permutations that contains at least two bases; and

sum of s, i and u is at least 5.

Claims 23 and 24 (Cancelled).

25. (Original) The method of claim 1, wherein Z is a photocleavable, acid cleavable, alkaline cleavable, oxidatively cleavable, or reductively cleavable group.

Claims 26-33 (Cancelled).

34. (Previously Presented) The method of claim 1, wherein Z has the formula: $(S^1)_tM(R^{15})_a(S^2)_bL$, wherein:

S^1 and S^2 are spacer moieties;

t and b are each independently 0 or 1;

a is an integer from 0 to 4;

M is a central moiety possessing three or more points of attachment;

R^{15} is a monovalent group independently selected from Y^2R^{18};

Y^2 is a divalent group independently having any combination of the following groups: a direct link, arylene, heteroarylene, cycloalkylene, $>C(R^{17})_2$, $C(R^{17})=C(R^{17})$, $>C=C(R^{23})(R^{24})$, $>C(R^{23})(R^{24})$, C≡C, O, $>S(A)_u$, $>P(D)_v(R^{17})$, $>P(D)_v(ER^{17})$, $>N(R^{17})$, $>N(COR^{17})$, $>N^+(R^{23})(R^{24})$, $>Si(R^{17})_2$ and >C(E); where u is 0, 1 or 2; v is 0, 1, 2 or 3; A is O or NR^{17}; D is S or O; and E is S, O or NR^{17};

R^{17} and R^{18} are each independently selected from the group consisting of hydrogen, halo, pseudohalo, cyano, azido, nitro, $SiR^{27}R^{28}R^{25}$, alkyl, alkenyl, alkynyl, haloalkyl, haloalkoxy, aryl, aralkyl, aralkenyl, aralkynyl, heteroaryl, heteroaralkyl, heteroaralkenyl, heteroaralkynyl, heterocyclyl, heterocyclylalkyl, heterocyclylalkenyl, heterocyclylalkynyl, hydroxy, alkoxy, aryloxy, aralkoxy, heteroaralkoxy and $NR^{19}R^{20}$;

R^{19} and R^{20} are each independently selected from hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, aralkyl, heteroaryl, heteroaralkyl and heterocyclyl;

R^{23} and R^{24} are selected from (i) or (ii) as follows:

(i) R^{23} and R^{24} are independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl and heteroaryl; or

(ii) R^{23} and R^{24} together form alkylene, alkenylene or cycloalkylene;

R^{25}, R^{27} and R^{28} are each independently a monovalent group selected from hydrogen, alkyl, alkenyl, alkynyl, haloalkyl, haloalkoxy, aryl, aralkyl, aralkenyl, aralkynyl, heteroaryl, heteroaralkyl, heteroaralkenyl, heteroaralkynyl, heterocyclyl, heterocyclylalkyl, heterocyclylalkenyl, heterocyclylalkynyl, hydroxy, alkoxy, aryloxy, aralkoxy, heteroaralkoxy and $NR^{19}R^{20}$;

R^{15}, R^{17}, R^{18}, R^{19}, R^{20}, R^{23}, R^{24}, R^{25}, R^{27} and R^{28} can be substituted with one or more substituents each independently selected from Z^2; Z^2 is selected from alkyl, alkenyl, alkynyl, aryl, cycloalkyl, cycloalkenyl, hydroxy, $S(O)_hR^{35}$; h is 0, 1 or 2, $NR^{35}R^{36}$, $COOR^{35}$, COR^{35}, $CONR^{35}R^{36}$, $OC(O)NR^{35}R^{36}$, $N(R^{35})C(O)R^{36}$, alkoxy, aryloxy, heteroaryl, heterocyclyl,

heteroaryloxy, heterocyclyloxy, aralkyl, aralkenyl, aralkynyl, heteroaralkyl, heteroaralkenyl, heteroaralkynyl, aralkoxy, heteroaralkoxy, alkoxycarbonyl, carbamoyl, thiocarbamoyl, alkoxycarbonyl, carboxyaryl, halo, pseudohalo, haloalkyl and carboxamido;

R^{35} and R^{36} are each independently selected from among hydrogen, halo, pseudohalo, cyano, azido, nitro, trialkylsilyl, dialkylarylsilyl, alkyldiarylsilyl, triarylsilyl, alkyl, alkenyl, alkynyl, haloalkyl, haloalkoxy, aryl, aralkyl, aralkenyl, aralkynyl, heteroaryl, heteroaralkyl, heteroaralkenyl, heteroaralkynyl, heterocyclyl, heterocyclylalkyl, heterocyclylalkenyl, heterocyclylalkynyl, hydroxy, alkoxy, aryloxy, aralkoxy, heteroaralkoxy, amino, amido, alkylamino, dialkylamino, alkylarylamino, diarylamino and arylamino; and

L is a group that is cleavable prior to or during mass spectrometric analysis of the compound.

Claims 35-37 (Cancelled).

38. (Original) The method of claim 34, wherein L is a disulfide moiety, a photocleavable group, an acid cleavable group, an alkaline cleavable group, a oxidatively cleavable group, or a reductively cleavable group.

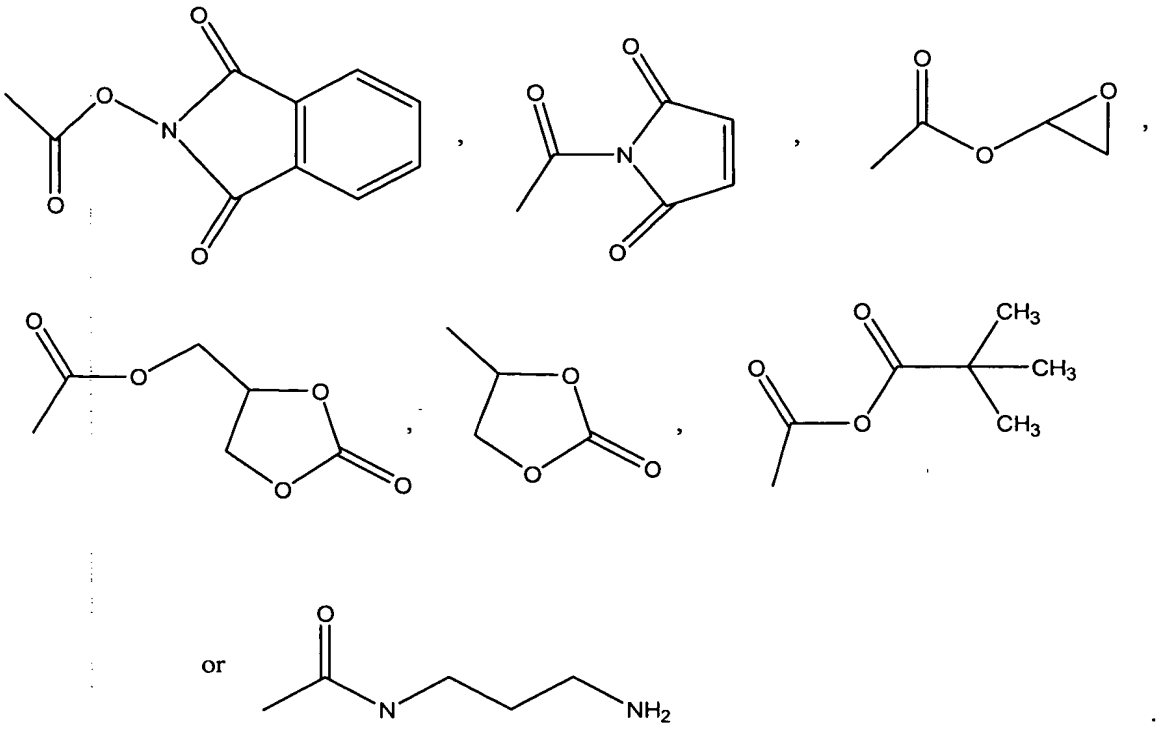
Claims 39-42 (Cancelled).

43. (Previously Presented) The method of claim 1, wherein each X is selected from the group consisting of an active ester, an active halo moiety, an amino acid side chain-specific functional group, and a specific peptide that binds to a biomolecule surfaces.

44. (Withdrawn) The method of claim 1, wherein an X is an α-halo ether, an α-halo carbonyl group, maleimido, a metal complex, an expoxide, and an isothiocyanate.

Claim 45 (Cancelled).

46. (Withdrawn) The method of claim 1, wherein X is



or

47. (Withdrawn) The method of claim 1, wherein the capture compounds comprise a mass modifying tag linked to Z.

Claims 48-54 (Cancelled).

55. (Withdrawn) The method of claim 18, wherein capture compounds are hybridized to a plurality of oligonucleotides or analogs thereof that comprise oligonucleotides that are complementary to each Q.

56. (Withdrawn) The method of claim 55, wherein the oligonucleotides or analog thereof that are complementary to Q are immobilized on a solid support as an array.

Claims 57-62 (Cancelled).

63. (Withdrawn) The method of claim 1, wherein the Z moiety of the capture compound comprises a functionality conferring luminescence, fluorescence, chemiluminescence or colorimetric properties.

Claims 64 and 65 (Cancelled).

66. (Withdrawn) The method of claim 1, wherein the capture compounds further comprise a solubility group W that influences the solubility properties of the capture compound.

67. (Withdrawn) The method of claim 1, wherein the selectivity function Y is a drug or drug intermediate/fragment selected from among those set forth in Figure 17 and Figure 21.

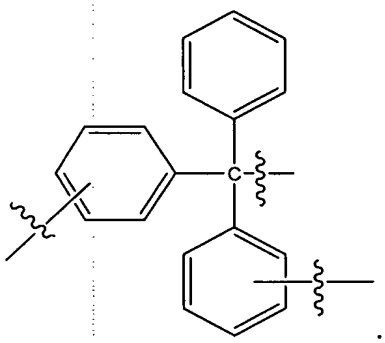
68. (Withdrawn) The method of claim 1, wherein the reactivity function X is selected from those set forth in Figure 16.

Claims 69-74 (Cancelled).

75. (Previously Presented) The method of claim 1, wherein Q is biotin.

Claim 76 (Cancelled).

77. (Withdrawn) The method of claim 1, wherein Z has the formula:



Claims 78-109 (Cancelled).

110. (Previously Presented) The method of claim 1, further comprising identifying or detecting a captured biomolecule by mass spectrometric analysis.

Claims 111-115 (Cancelled).

116. (Previously Presented) The method of claim 1, wherein the sample comprises a biological sample, a body tissue or fluid or a cell lysate.

Claim 117 (Cancelled).

Claims 118-136 (Cancelled).

137. (Previously Presented) The method of claim 1, wherein Z has the formula: $(S^1)_tM(R^{15})_a(S^2)_b$, wherein:

S^1 and S^2 are spacer moieties;

t and b are each independently 0 or 1;

a is an integer from 0 to 4;

M is a central moiety possessing three or more points of attachment;

R^{15} is a monovalent group independently selected from Y^2R^{18};

Y^2 is a divalent group independently having any combination of the following groups: a direct link, arylene, heteroarylene, cycloalkylene, $>C(R^{17})_2$, $C(R^{17})=C(R^{17})$,

$>C=C(R^{23})(R^{24})$, $>C(R^{23})(R^{24})$, $C\equiv C$, O, $>S(A)_u$, $>P(D)_v(R^{17})$, $>P(D)_v(ER^{17})$, $>N(R^{17})$, $>N(COR^{17})$, $>N^+(R^{23})(R^{24})$, $>Si(R^{17})_2$ and >C(E); wherein:

u is 0, 1 or 2;

v is 0, 1, 2 or 3;

A is O or NR^{17};

D is S or O; and

E is S, O or NR^{17};

R^{17} and R^{18} are each independently selected from the group consisting of hydrogen, halo, pseudohalo, cyano, azido, nitro, $SiR^{27}R^{28}R^{25}$, alkyl, alkenyl, alkynyl, haloalkyl, haloalkoxy, aryl, aralkyl, aralkenyl, aralkynyl, heteroaryl, heteroaralkyl, heteroaralkenyl, heteroaralkynyl, heterocyclyl, heterocyclylalkyl, heterocyclylalkenyl, heterocyclylalkynyl, hydroxy, alkoxy, aryloxy, aralkoxy, heteroaralkoxy and $NR^{19}R^{20}$;

R^{19} and R^{20} are each independently selected from hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, aralkyl, heteroaryl, heteroaralkyl and heterocyclyl;

R^{23} and R^{24} are selected from (i) or (ii) as follows:

(i) R^{23} and R^{24} are independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl and heteroaryl; or

(ii) R^{23} and R^{24} together form alkylene, alkenylene or cycloalkylene;

R^{25}, R^{27} and R^{28} are each independently a monovalent group selected from hydrogen, alkyl, alkenyl, alkynyl, haloalkyl, haloalkoxy, aryl, aralkyl, aralkenyl, aralkynyl, heteroaryl, heteroaralkyl, heteroaralkenyl, heteroaralkynyl, heterocyclyl, heterocyclylalkyl, heterocyclylalkenyl, heterocyclylalkynyl, hydroxy, alkoxy, aryloxy, aralkoxy, heteroaralkoxy and $NR^{19}R^{20}$;

R^{15}, R^{17}, R^{18}, R^{19}, R^{20}, R^{23}, R^{24}, R^{25}, R^{27} and R^{28} can be substituted with one or more substituents each independently selected from Z^2; Z^2 is selected from alkyl, alkenyl, alkynyl, aryl, cycloalkyl, cycloalkenyl, hydroxy, $S(O)_hR^{35}$; h is 0, 1 or 2, $NR^{35}R^{36}$, $COOR^{35}$, COR^{35}, $CONR^{35}R^{36}$, $OC(O)NR^{35}R^{36}$, $N(R^{35})C(O)R^{36}$, alkoxy, aryloxy, heteroaryl, heterocyclyl, heteroaryloxy, heterocyclyloxy, aralkyl, aralkenyl, aralkynyl, heteroaralkyl, heteroaralkenyl, heteroaralkynyl, aralkoxy, heteroaralkoxy, alkoxycarbonyl, carbamoyl, thiocarbamoyl, alkoxycarbonyl, carboxyaryl, halo, pseudohalo, haloalkyl and carboxamido; and

R^{35} and R^{36} are each independently selected from among hydrogen, halo, pseudohalo, cyano, azido, nitro, trialkylsilyl, dialkylarylsilyl, alkyldiarylsilyl, triarylsilyl, alkyl, alkenyl,

alkynyl, haloalkyl, haloalkoxy, aryl, aralkyl, aralkenyl, aralkynyl, heteroaryl, heteroaralkyl, heteroaralkenyl, heteroaralkynyl, heterocyclyl, heterocyclylalkyl, heterocyclylalkenyl, heterocyclylalkynyl, hydroxy, alkoxy, aryloxy, aralkoxy, heteroaralkoxy, amino, amido, alkylamino, dialkylamino, alkylarylamino, diarylamino and arylamino.

Claim 138 (Cancelled).

139. (Original) The method of claim 1, wherein X is a photoactivatable group.

140. (Original) The method of claim 139, wherein the capture compound interacts with the biomolecule mixture prior to activation of the photoactivatable group.

Claims 141 and 142 (Cancelled).

143. (Withdrawn) The method of claim 1, further comprising

re-designing the moiety Y to eliminate or alter its binding interactions with a captured biomolecule.

144. (Previously Presented) The method of claim 1, further comprising identifying a function of a captured biomolecule.

145. (Withdrawn) The method of claim 143, wherein the alteration in binding is an increase in binding.

146. (Withdrawn) The method of claim 143, wherein the alteration in binding is a decrease in binding.

147. (Withdrawn) The method of claim 143, wherein the biomolecule for which binding is altered is a non-target biomolecule.

Claims 148-150 (Cancelled).

151. (Previously Presented) The method of claim 1, wherein the sample is contacted with a collection of capture compounds.

152. (Previously Presented) The method of claim 1, wherein the X moiety of the capture compound comprises an azide, diazirine or a group which, following activation, reacts with the biomolecule.

153. (Withdrawn) The method of claim 143, wherein the method is repeated with the re-designed moiety Y linked to a capture compound to effect further modification thereof.

Claim 154 (Cancelled).

155. (Withdrawn) The method of claim 143, wherein the captured biomolecule for which binding is altered is a drug target protein.

156. (Withdrawn) The method of claim 143, wherein the captured biomolecule for which binding is altered is a non-drug target protein.

Claim 157 (Cancelled).

158. (Currently Amended) The method of claim ~~157~~1, wherein after equilibrium the mixture is treated to form a covalent bond between the capture agent and the proteins.

159. (Previously Presented) The method of claim 158, wherein the treatment comprises a change in pH.

160. (Previously Presented) The method of claim 1, wherein a concentration of capture compound is varied in a plurality of different reactions.

161. (Previously Presented) The method of claim 160, wherein a dissociation constant (Kd value) is determined.

Claim 162 (Cancelled).

163. (Currently Amended) The method of claim 110, wherein the mass spectrometric analysis ~~spectrometry~~ format is selected from among matrix assisted laser desorption ionization (MALDI), continuous or pulsed electrospray (ES) ionization, ionspray, thermospray, and massive cluster impact mass spectrometry.

164. (Currently Amended) The method of claim 163, wherein the mass spectrometric analysis detection format is linear time-of-flight (TOF), reflectron time-of-flight, single quadruple, multiple quadruple, single magnetic sector, multiple magnetic sector, Fourier transform, ion cyclotron resonance (ICR), or ion trap.

Claim 165 (Cancelled).

166. (Previously Presented) The method of claim 144, wherein the function of the biomolecule is determined by sequence alignment, pharmacophores, homology models and protein motif correlation, liver microsomes metabolic pathways, cDNA-expressed enzymes, signal pathways and back-mapping to yeast pathways, simulations and protein/protein interaction of pull-out proteins, native polymorphisms, knock-out/knock-in, flow cytometry, therapeutic activity of the drug, or prospective genotyping and prospective phenotyping.

167. (Withdrawn) The method of claim 143, wherein:

the moiety Y is a first drug; and

redesigning the first drug results in a second drug with fewer side-effects or an increased therapeutic index as compared to the first drug.

168. (Withdrawn) The method of claim 1, wherein the drug is selected from among troglitazone, rosiglitazone, pioglitazone, methotrexate, atorvastatin, celecoxib, refecoxib and cerivastatin.

169. (Previously Presented) The method of claim 158, wherein the treatment comprises activation with light.

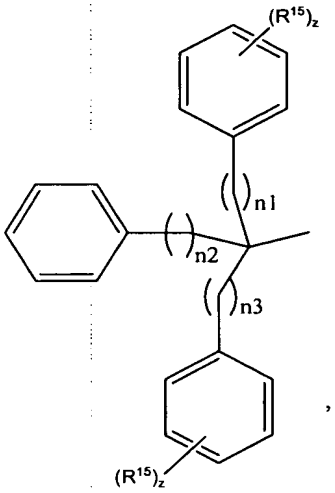
170. (Cancelled).

171. (Withdrawn) The method of claim 22, where B is a single stranded DNA or RNA and the number of sequence permutations is equal to 4^i, wherein i is about 2 to about 25.

172. (Withdrawn) The method of claim 171, where i is about 3 to about 5, 6, 7 or 8.

Claim 173 (Cancelled).

174. (New, withdrawn) The method of claim 1, wherein the moiety Z has the formula:



R^{15} is H, OH, OR^{51}, SH, SR^{51}, NH_2, NHR^{51}, $N(R^{51})_2$, F, Cl, Br, I, SO_3H, PO_4, CH_3, CH_2CH_3, $CH(CH_3)_2$ or $C(CH_3)_3$;

R^{51} is straight or branched chain alkyl, straight or branched chain alkenyl, straight or branched chain alkynyl, aryl, heteroaryl, cycloalkyl, heterocyclyl, straight or branched chain aralkyl, straight or branched chain aralkenyl, straight or branched chain aralkynyl, straight or branched chain heteroaralkyl, straight or branched chain heteroaralkenyl, straight or branched chain heteroaralkynyl, straight or branched chain cycloalkylalkyl, straight or branched chain cycloalkylalkenyl, straight or branched chain cycloalkylalkynyl, straight or branched chain heterocyclylalkyl, straight or branched chain heterocyclylalkenyl or straight or branched chain heterocyclylalkynyl;

z is an integer from 1 to 4; and

n1, n2, n3 are 0 to 4 with the proviso that all n1, n2 and n3 are not equal to 0 at the same time.